Heating Coil Load and Hot Water Flow

Load of an air heating coil from air flow and temperatures (moist-air enthalpy), and the hot water flow for its supply and return temperatures (IF97).

Method: Moist-air energy balance (ASHRAE Handbook—Fundamentals ch. 1); water enthalpies from IAPWS-IF97

Input parameters

Unit system: SI

Parameter	Value	Unit
Air flow (at the inlet)	10,000	m³/h
Air in	5.0000	°C
Inlet relative humidity	80.000	%
Air out	28.000	°C
Hot water in	80.000	°C
Hot water out	60.000	°C
Barometric pressure (absolute)	101.33	kPa

Calculated results

Parameter	Value	Unit
Coil load	81.651	kW
Hot water flow	3.5107	t/h
Leaving relative humidity	18.453	%

Notes for this case

- Water enthalpies at 10 bar(a) (IAPWS-IF97). For steam coils divide the load by the latent heat instead.

Formula and method

$$\dot{Q} = \dot{m}_{da}\left[h(T_2, W) - h(T_1, W)\right], \quad \dot{m}_w = \frac{\dot{Q}}{h_{w1} - h_{w2}}$$

Variables

$\dot{V}$	Air flow (at the inlet)	m³/s
T_1	Air in	K
φ_1	Inlet relative humidity	-
T_2	Air out	K
T_{w1}	Hot water in	K
T_{w2}	Hot water out	K
p	Barometric pressure (absolute)	Pa
$\dot{Q}$	Coil load	W
$\dot{m}_w$	Hot water flow	kg/s
φ_2	Leaving relative humidity	-

Method and standards

Energy balance.

Assumptions and limits

- Steady state. Hot water up to 179.9 °C (liquid at the 10 bar(a) used for its properties).

References

- Moist-air energy balance (ASHRAE Handbook—Fundamentals ch. 1); water enthalpies from IAPWS-IF97

Report details

Report reference	FCC-V0GF-H797 (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Heating Coil Load and Hot Water Flow
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/hvac/psychrometry/heating-coil-load

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.